

What is Claimed is:

1. A bone anchor insertion device, comprising:
a handle;
a nosepiece connected to a distal end of said handle;
a bone anchor connected to said nosepiece;
5 an actuator disposed on said handle for deploying said bone anchor; and
a suture tensioning mechanism disposed in said handle for tensioning suture
which is associated with said bone anchor.
2. The bone anchor insertion device as recited in Claim 1, wherein said
suture tensioning mechanism comprises a suture knob and a suture ratchet wheel,
and wherein said suture knob is rotatable to rotate said suture ratchet wheel.
3. The bone anchor insertion device as recited in Claim 2, wherein said
suture ratchet wheel includes a suture fixation slit disposed therein for receiving a
free end of said suture.
4. The bone anchor insertion device as recited in Claim 1, wherein said
suture is fixed to a portion of soft tissue to be attached to a portion of bone.
5. The bone anchor insertion device as recited in Claim 1, wherein said
bone anchor comprises a tubular body which is adapted to received said suture
therethrough.
6. A bone anchor insertion device, comprising:
a handle;
a nosepiece connected to a distal end of said handle, said nosepiece

comprising an outer tube having a suture opening formed in its distal end and an
 5 inner tube disposed coaxially within said outer tube, said inner tube including a
 longitudinal opening therein, said inner tube being fixed relative to the outer tube;
 a pull tube insertable into said inner tube;
 a bone anchor disposed on said pull tube, said bone anchor including a
 laterally deployable member for engaging adjacent bone matter to secure said bone
 10 anchor in said bone matter; and
 an actuator disposed in said handle for pulling said pull tube proximally to
 deploy the laterally deployable member of said bone anchor by engaging said
 laterally deployable member with a distal end surface of said inner tube.

7. The bone anchor insertion device as recited in Claim 6, wherein said
 laterally deployable member comprises a toggle ring member.

8. The bone anchor insertion device as recited in Claim 6, and further
 comprising a suture immobilizing member which is associated with said bone
 anchor for immobilizing a length of suture situated within said bone anchor.

9. The bone anchor insertion device as recited in Claim 8, wherein said
 suture immobilizing member is connected to a distal end of said pull tube, so that
 further actuation of said actuator on said handle after deployment of said laterally
 deployable member of said bone anchor causes said suture immobilizing member to
 5 move proximally to engage and immobilize said length of suture.

10. The bone anchor insertion device as recited in Claim 9, wherein said
 suture immobilizing member comprises a suture plug.

11. The bone anchor insertion device as recited in Claim 9, and further

comprising a tab disposed at a distal end of said pull tube for attaching said bone anchor to said pull tube, said tab being designed to break upon continued proximal movement of said pull tube once said laterally deployable member has been

5 completely deployed, so that further proximal movement of said pull tube causes said suture immobilizing member to move proximally.

12. The bone anchor insertion device as recited in Claim 6, and further comprising a suture tensioning mechanism disposed in said handle for tensioning suture which is associated with said bone anchor.

13. The bone anchor insertion device as recited in Claim 12, wherein said suture tensioning mechanism comprises a suture knob and a suture ratchet wheel, and wherein said suture knob is rotatable to rotate said suture ratchet wheel.

14. The bone anchor insertion device as recited in Claim 13, wherein said suture ratchet wheel includes a suture fixation slit disposed therein for receiving a free end of said suture.

15. A method for making an orthopedic repair, by re-attaching a portion of soft tissue to a portion of adjacent bone, using a bone anchor insertion device comprising a handle and a nosepiece attached to a distal end of said handle, said method comprising:

- 5 a) passing a length of suture through said portion of soft tissue so that a loop of suture is embedded therein;
- b) passing a free end of said length of suture through said nosepiece, a bone anchor disposed thereon, and said handle; and
- c) securing said free end of said length of suture to a suture tensioning
- 10 mechanism in said handle.

20. The method as recited in Claim 19, and further comprising:
h) separating said bone anchor insertion device from said bone anchor
and suture plug;

- 5 i) withdrawing said bone anchor insertion device from the repair site;
and
j) trimming off said suture to complete the repair.

21. The method as recited in Claim 20, and further comprising repeating
steps a) through j) to create another attachment between said portion of soft tissue
and said adjacent bone.

22. The method as recited in Claim 15, wherein step b) comprises
passing two free ends of said suture through said nosepiece, a bone anchor disposed
therein, and said handle.

23. A method for making an orthopedic repair, by re-attaching a portion
of soft tissue to a portion of adjacent bone, using a bone anchor insertion device
comprising a handle and a nosepiece attached to a distal end of said handle, said
method comprising:

- 5 a) passing a length of suture through said portion of soft tissue so that a
loop of suture is embedded therein;
b) inserting a pull tube, on which is disposed a bone anchor having a
laterally deployable member, into said nosepiece;
c) passing at least one free end of said length of suture through said
10 nosepiece, said bone anchor, and said handle, using snares;
d) locating said bone anchor so that it lies beneath a cortical bone
surface of said portion of adjacent bone; and

16. The method as recited in Claim 15, said method further comprising:
- d) locating said bone anchor so that it lies beneath a cortical bone surface of said portion of adjacent bone;
 - e) deploying said bone anchor so that it remains in place beneath said
 - 5 cortical bone surface; and
 - f) actuating said suture tensioning mechanism to tension said length of suture, thereby approximating said soft tissue portion to said adjacent bone portion as desired.

17. The method as recited in Claim 16, wherein said bone anchor insertion device further comprises a pull tube disposed in said nosepiece, and an actuator on said handle for moving said pull tube proximally a desired distance, said bone anchor deployment step further comprising actuating said handle actuator
- 5 to move said pull tube proximally, until a laterally deployable portion of said bone anchor abuts a mandrel surface on said nosepiece and is thereby forced to laterally deploy.

18. The method as recited in Claim 17, wherein, subsequent to said bone anchor deployment step a connection between said bone anchor and said pull tube fractures upon continued proximal movement of said pull tube.

19. The method as recited in Claim 18, said bone anchor insertion device further comprising a suture plug attached to a distal end of said pull tube for immobilizing suture within said bone anchor, said method further comprising:
- g) continuing to actuate said handle actuator, to thereby move said pull
 - 5 tube proximally, to thereby move said suture plug proximally to immobilize suture within said bone anchor.

- e) actuating an actuator on said handle to move said pull tube proximally, until said bone anchor is engaged with a mandrel surface on said nosepiece and said laterally deployable member is forced to deploy.

24. The method as recited in Claim 23, and further comprising:

- f) tensioning said length of suture to approximate said portion of soft tissue to said adjacent portion of bone, as desired.

25. The method as recited in Claim 24, and further comprising:

- g) continuing to actuate said actuator on said handle to further move said pull tube proximally, to thereby move a suture plug attached to a distal end of said pull tube proximally to engage and immobilize suture disposed in said bone anchor.

26. The method as recited in Claim 25, and further comprising:

- h) separating said bone anchor insertion device from said bone anchor and suture plug;
- i) withdrawing said bone anchor insertion device from the repair site;
- and
- j) trimming off said suture to complete the repair.

27. The method as recited in Claim 26, and further comprising repeating steps a) through j) to create another attachment between said portion of soft tissue and said adjacent bone.

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